

REMARKS

The Office Action requested a replacement copy of PTO-1449, originally submitted with the Information Disclosure Statement mailed February 6, 2004.

Applicants found that a copy, marked up and signed by the Examiner, was included with this Office Action. This marked-up copy is enclosed, pursuant to the request.

Claim 17 is amended to correct its dependency on claim 16. A typographical error in the chemical formula in claims 12, 13, 21 and 24 is corrected.

Claim Rejection under 35 USC § 112

Claim 17 was rejected under 35 U.S.C. § 112 because of an error in dependency. In view of the amendment to make claim 17 dependent upon claim 16, it is respectfully requested that the rejection under Section 112 be withdrawn and that the claim be allowed.

Claim Rejection under 35 USC § 103 based upon Caren et al. and Naohiro et al.

Claims 1-3, 6, 9-16 and 19-24 were rejected under 35 U.S.C. § 103 as unpatentable over United States Patent No. 6,357,223, issued to Caren et al. in 2002, in view of Japan Patent Document 2000-140642, by Naohiro et al. published in 2000.

For purposes of this response, “selected metal” refers to a metal selected from the

group listed in claim 1, at least some of which are considered noble metals.

Caren et al. discloses a corona discharge device used in combination with a catalytic element for treating automotive exhaust gas. The rejection points particularly to Fig. 13 as showing an arrangement of a corona discharge device 30 with honeycomb catalyst bricks 132. However, Caren et al. contemplates treatment with conventional noble metal or other catalytic material, col. 11, line 63, to col. 12, line 8. It does not suggest a noble metal phosphate compound. In fact, at col. 11, lines 18, Caren et al. discloses that phosphates of noble metals are catalyst poisons that are removed or prevented by the free radicals or oxidizing species created by the corona discharge device. In contrast, Applicants have found that, whereas noble metal catalyst is rendered ineffective by a plasma field, a noble metal in a zirconium phosphate compound is an effective catalyst in the presence of the plasma field. Thus, Caren et al. does not suggest Applicants' invention, and even teaches away from the use of noble metal phosphate compound as catalyst.

The rejection looks to Naohiro et al. to make up the deficiency. Naohiro et al. describes a catalyst composition that includes zirconium phosphate and a noble metal. Nothing in Naohiro et al. even remotely suggests a plasma field treatment, or teaches use of the catalyst therein in the presence of such field. Moreover, the noble metal in Naohiro et al. is applied separate from the phosphate compound. In Example 1, the zirconium and titanium phosphate was formed and applied, prior to the platinum. Thus, Naohiro et al. provides noble metal catalyst as an elemental metal, as is commonly used

for exhaust gas treatment, and in marked contrast to a compound, or more particularly a phosphate compound, as in Applicants' invention.

Even when the references are combined, they do not point to Applicants' invention. Both Caren et al. et al. and Naohiro et al. contemplate noble metal catalyst in noncompounded, metallic form. Even if the express teaching in Caren et al. is ignored that noble metal phosphate is a catalyst poison to be eliminated by plasma products, and assuming hypothetically that the catalyst composition in Naohiro et al. is used in the Caren et al. apparatus, the catalyst metal is still in noncompounded form. Applicants have found that metallic platinum lasts 0 hours as a catalyst in a plasma field, paragraph [0069]. In dramatic contrast, Applicants' tests indicate that platinum zirconium phosphate with the plasma field in accordance with Applicants' invention will last 2000 or more hours. There is nothing in Caren et al. et al. or Naohiro et al. to lead the practitioner to compounding a noble metal for combination with a plasma field treatment as in Applicants' invention, or the surprising and substantial improvement in durability found by Applicants.

Claim 1 is directed to Applicants' process for treating exhaust gas that includes exposing the gas to a plasma field and to a selected metal zirconium phosphate compound. The references do not point to a phosphate compound containing a selected metal, its use with a plasma field, or the remarkable results found by Applicants. Thus, the references do not suggest Applicants' invention as set forth in claim 1.

Claims 2-3, 6, and 9-15 are dependent upon claim 1 and so not suggested by the references for the reasons set forth with regard to that claim.

Claim 16 is directed to Applicants' gas treatment system that includes a non-thermal plasma reactor and a catalyst composition. The catalyst composition is characterized similar to claim 1 and is a zirconium phosphate compound containing the selected metal. For the reasons given for claim 1, the references do not show this compound arranged with a plasma reactor for exhaust gas treatment. Therefore, the references cannot suggest Applicants' system in claim 16, or in claims 19-24 dependent thereon.

Accordingly, it is respectfully requested that the rejection of the claims based upon Caren et al. and Naohiro et al. be reconsidered and withdrawn, and that the claims be allowed.

Claim Rejection under 35 USC § 103 based upon Caren et al, Naohiro et al. and Hsiao et al.

Claims 4, 5, 7, 8, 17 and 18 were rejected under 35 U.S.C. § 103 as unpatentable over Caren et al. and Naohiro et. al, further in view of United States Patent No. 5,891,409, issued to Hsiao et al. in 1999.

Claims 4, 5, 7 and 8 are dependent upon claim 1; whereas claims 17 and 18 are

dependent upon claim 16. For the reasons set forth with regard to the rejection of the independent claims 1 and 16, neither Caren et al. nor Naohiro et al nor their combination suggest Applicants' invention.

The rejection now relies upon Hsiao et al. to show a pulsed coronal discharge for treating internal combustion engine exhaust gas. Hsiao et al. does mention noble metal catalyst, particularly platinum, col. 12, lines 45-47, and col. 13, lines 46-48, but also suggest an advantage in using catalyst free of noble metal, col. 10, lines 1-4. In any event, Hsiao et al. does not show a selected metal phosphate catalyst. Thus, even with the addition of Hsiao et al., the combination still fails to show Applicants' invention that includes treatment with a plasma field and compound catalyst of the selected metal.

For these reasons, the combination of the primary references with Hsiao et al. does not suggest Applicants' process or gas treatment system in claims 1 or 16. It follows therefore that they do not suggest those aspects in the claims dependent thereon.

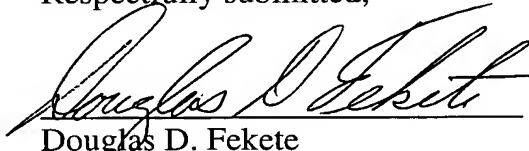
Therefore, it is respectfully requested that the rejection of the claims 4, 5, 7, 8, 17 and 18 under 35 U.S.C. § 103 be reconsidered and withdrawn, and that the claims be allowed.

Conclusion

It is believed, in view of the amendments and remarks herein, that all grounds of rejection of the claims have been addressed and overcome, and that all claims are in condition for allowance. If it would further prosecution of the application, the Examiner is urged to contact the undersigned at the phone number provided.

The Commissioner is hereby authorized to charge any fees associated with this communication to Deposit Account No. 50-0831.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Douglas D. Fekete", is written over a horizontal line.

Douglas D. Fekete

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INFORMATION DISCLOSURE CITATION WITH DOCUMENT COPIES

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Applicant

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Group

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PATENT DOCUMENTS

Exam. Init.	Document Number	Date	Name	Class	Sub Class	Filing Date (if approp.)
	6,638,484	10/28/2003	Nelson, et al.	422	186.04	
	6,537,507	03/25/2003	Nelson, et al.	422	186	
	6,482,368	11/19/2002	Hemingway, et al.	422	186.04	
	6,464,945	10/15/2002	Hemingway	422	174	
	6,423,190	07/23/2002	Hemingway, et al.	204	164	
	6,368,451	04/09/2002	Goulette, et al.	174	152R	
	6,354,903	03/12/2002	Nelson	445	58	
	6,338,827	01/15/2002	Nelson, et al.	422	186.04	

FOREIGN PATENT DOCUMENTS

Document Number	Date	Country	Class	Subclass	Translation Yes No

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

Examiner

Date Considered

3/15/04

*Examiner: Initial if reference considered whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-FB-A820 (also PTO-1449) Patent & Trademark Office-US Dept. of Commerce

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